

I Claim:

1. A prosthesis system to replace a natural facet joint between adjoining inferior and superior vertebral bodies comprising

5 a caudal prosthesis accommodating fixation to the inferior vertebral body at or near a pedicle and without support by a lamina, including an artificial caudal facet joint structure adapted and configured to replace all or a portion of a caudal portion of the  
10 natural facet joint, and

a cephalad prosthesis accommodating fixation to the superior vertebral body at or near a pedicle and without support by a lamina, including an artificial cephalad facet joint structure adapted and configured to  
15 replace all or a portion of a cephalad portion of the natural facet joint and to articulate with the artificial caudal facet joint structure, thereby forming an artificial facet joint between the adjoining vertebral bodies.

20 2. A prosthesis system according to claim 1 wherein the artificial caudal facet joint structure is adapted and configured to replace a natural articular process of a caudal portion of the natural facet joint on the inferior vertebral body.

25 3. A prosthesis system according to claim 1 wherein the artificial caudal facet joint structure is adapted and configured to replace a natural articular process of a caudal portion of the natural facet joint after removal of at least some of a lamina  
30 from the inferior vertebral body.

35 4. A prosthesis system according to claim 1 wherein the artificial caudal facet joint structure is adapted and configured to replace a natural articular process of a caudal portion of the natural facet joint after removal of at least part of a mamillary

process from the inferior vertebral body.

5. A prosthesis system according to claim 1  
wherein the artificial caudal facet joint  
structure is adapted and configured to replace a natural  
articular process of a caudal portion of the natural  
facet joint after removal of at least part of a  
transverse process from the inferior vertebral body.

10. A prosthesis system according to claim 1  
wherein the artificial caudal facet joint  
structure is adapted and configured to replace a natural  
articular process of a caudal portion of the natural  
facet joint after removal of at least part of a pedicle  
from the inferior vertebral body.

15. A prosthesis system according to claim 1  
wherein the artificial caudal facet joint  
structure is adapted and configured to replace a natural  
articular process of a caudal portion of the natural  
facet joint after removal of at least some of the natural  
articular process from the inferior vertebral body.

20. A prosthesis system according to claim 1  
wherein the artificial caudal facet joint  
structure is adapted and configured to replace a natural  
articular process of a caudal portion of the natural  
facet joint after removal of at least some of the natural  
articular process and of at least some of a lamina from  
the inferior vertebral body.

25. A prosthesis system according to claim 1  
wherein the artificial caudal facet joint  
structure is adapted and configured to replace a natural  
articular process of a caudal portion of the natural  
facet joint after removal of at least some of the natural  
articular process and of at least some of a mamillary  
process from the inferior vertebral body.

30. A prosthesis system according to claim 1  
wherein the artificial caudal facet joint

structure is adapted and configured to replace a natural articular process of a caudal portion of the natural facet joint after removal of at least some of the natural articular process and of at least part of a transverse process from the inferior vertebral body.

5        11. A prosthesis system according to claim 1 wherein the artificial caudal facet joint structure is adapted and configured to replace a natural articular process of a caudal portion of the natural 10 facet joint after removal of at least some of the natural articular process and of at least part of a pedicle from the inferior vertebral body.

10        12. A prosthesis system according to claim 1 wherein the artificial cephalad facet joint structure is adapted and configured to replace a natural articular process of a cephalad portion of the natural 15 facet joint on the superior vertebral body.

15        13. A prosthesis system according to claim 1 wherein the artificial cephalad facet joint structure is adapted and configured to replace a natural articular process of a cephalad portion of the natural 20 facet joint after removal of at least some of a lamina from the superior vertebral body.

20        14. A prosthesis system according to claim 1 wherein the artificial cephalad facet joint structure is adapted and configured to replace a natural articular process of a cephalad portion of the natural 25 facet joint after removal of at least part of an accessory process from the superior vertebral body.

25        15. A prosthesis system according to claim 1 wherein the artificial cephalad facet joint structure is adapted and configured to replace a natural articular process of a cephalad portion of the natural 30 facet joint after removal of at least part of a transverse process from the superior vertebral body.

16. A prosthesis system according to claim 1  
wherein the artificial cephalad facet joint  
structure is adapted and configured to replace a natural  
articular process of a cephalad portion of the natural  
facet joint after removal of at least part of a pedicle  
5 from the superior vertebral body.

17. A prosthesis system according to claim 1  
wherein the artificial cephalad facet joint  
structure is adapted and configured to replace a natural  
10 articular process of a cephalad portion of the natural  
facet joint after removal of at least some of the natural  
articular process from the superior vertebral body.

18. A prosthesis system according to claim 1  
wherein the artificial cephalad facet joint  
15 structure is adapted and configured to replace a natural  
articular process of a cephalad portion of the natural  
facet joint after removal of at least some of the natural  
articular process and of at least some of a lamina from  
the superior vertebral body.

20 19. A prosthesis system according to claim 1  
wherein the artificial cephalad facet joint  
structure is adapted and configured to replace a natural  
articular process of a cephalad portion of the natural  
facet joint after removal of at least some of the natural  
25 articular process and of at least some of an accessory  
process from the superior vertebral body.

20. A prosthesis according to claim 1  
wherein the artificial cephalad facet joint  
structure is adapted and configured to replace a natural  
30 articular process of a cephalad portion of the natural  
facet joint after removal of at least some of the natural  
articular process and of at least part of a transverse  
process from the superior vertebral body.

35 21. A prosthesis system according to claim 1  
wherein the artificial cephalad facet joint

structure is adapted and configured to replace a natural articular process of a cephalad portion of the natural facet joint after removal of at least some of the natural articular process and of at least part of a pedicle from  
5 the superior vertebral body.

22. A prosthesis system according to claim 1 wherein the caudal prosthesis is adapted and configured to replace at least some of a pedicle of the inferior vertebral body.

10 23. A prosthesis system according to claim 1 wherein the caudal prosthesis is adapted and configured to replace at least some of a lamina of the inferior vertebral body.

15 24. A prosthesis system according to claim 1 wherein the caudal prosthesis is adapted and configured to replace at least some of a mamillary process of the inferior vertebral body.

20 25. A prosthesis system according to claim 1 wherein the cephalad prosthesis is adapted and configured to replace at least some of a lamina of the superior vertebral body.

25 26. A prosthesis system according to claim 1 wherein the cephalad prosthesis body is adapted and configured to replace at least some of a mamillary process of the superior vertebral body.

27. A prosthesis system according to claim 1 wherein at least one of the artificial facet joint structures is made of at least one selected prosthetic material.

30 28. A prosthesis system according to claim 27 wherein the selected prosthetic material includes polyethylene, rubber, tantalum, titanium, chrome cobalt, surgical steel, bony in-growth material, ceramic, artificial bone, or a combination thereof.

35 29. A prosthesis system according to claim 1

wherein at least one of the caudal and cephalad prosthesis includes a fastening element installed within the vertebral body at or near a pedicle.

5           30. A prosthesis system according to claim 29 wherein the fastening element includes a screw installed within the vertebral body at or near a pedicle.

              31. A prosthesis system according to claim 29 wherein the fastening element includes a stem installed within the vertebral body at or near a pedicle.

10          32. A prosthesis system according to claim 29 wherein the fastening element including means for resisting rotation after installation in the vertebral body.

15          33. A prosthesis system according to claim 1 wherein at least one of the caudal and cephalad prosthesis is fixed to the vertebral body by an adhesive or cement.

20          34. A prosthesis system according to claim 1 wherein at least one of the caudal and cephalad prosthesis includes a bony in-growth material.

              35. A prosthesis system according to claim 1 wherein the caudal prosthesis includes a fastening element installed within the vertebral body at or near a pedicle, and

25          wherein the artificial caudal facet joint structure is carried by the fastening element.

              36. A prosthesis system according to claim 35 wherein the fastening element includes a screw installed within the vertebral body at or near a pedicle.

30          37. A prosthesis system according to claim 35 wherein the fastening element includes a stem installed within the vertebral body at or near a pedicle.

              38. A prosthesis system according to claim 35 wherein the fastening element including means 35 for resisting rotation after installation in the

vertebral body.

39. A method of replacing a natural facet joint between adjoining inferior and superior vertebral bodies using the prosthesis system defined in claim 1 to 5 provide improved support for the spinal column, the method comprising the steps of

(i) removing from the inferior vertebral body all or a portion of a caudal portion of the natural facet joint,

10 (ii) removing from the superior vertebral body all or a portion of a cephalad portion of the natural facet joint,

15 (iii) fixing the caudal prosthesis as defined in claim 1 to the inferior vertebral body to replace the removed caudal portion of the natural facet joint with the artificial caudal facet joint structure,

20 (iv) fixing the cephalad prosthesis as defined in claim 1 to the superior vertebral body to replace the removed cephalad portion of the natural facet joint with the artificial cephalad facet joint structure, and

25 (v) affecting articulation between the artificial caudal facet joint structure and the artificial cephalad facet joint structure to create an artificial facet joint between the adjoining vertebral bodies.

40. A method according to claim 39 further including a step of removing at least some of the lamina from the inferior vertebral body.

41. A method according to claim 39 30 further including a step of removing at least part of a mamillary process from the inferior vertebral body.

42. A method according to claim 39 35 further including a step of removing at least part of a transverse process from the inferior vertebral

body.

43. A method according to claim 39  
further including a step of removing at least  
part of a pedicle from the inferior vertebral body.

5 44. A method according to claim 39  
further including a step of removing at least  
part of an accessory process from the superior vertebral  
body.

10 45. A method according to claim 39  
further including a step of removing at least  
part of a transverse process from the superior vertebral  
body.

15 46. A method according to claim 39  
further including a step of removing at least  
part of a pedicle from the superior vertebral body.